

Remarks

Claim rejections under 35 USC § 103

Claims 1, 3-9, 11, 12, 16, 20, 22, 23, 27, 28, 32 and 34 stand rejected under 35 USC § 103(a) as being unpatentable over Smart et al. (US 2002/0041637) in view of Shpantzer et al. (US 2002/0186435) and Shpantzer (Shpantzer: "A New Generation of Coherent ULH Fiber Optic Communication", OECC-2000 Conference).

This rejection is traversed in light of the following comments.

Any anticipation, by Smart et al., of a method or apparatus for transmitting or receiving an OFDM modulated signal over an optical channel is purely accidental, in the sense that Smart et al. were concerned with the very different problem of improving upon previous, conventional (block-based) OFDM transmitters and receivers (see Smart, paragraph [0028]). In this context, Smart et al. suggested an optical fiber merely as one of a number of examples of media which could be used to deliver the improved signals which they had developed. It is clear therefore, that what Smart et al. propose is a modulated signal which can be transmitted over any one of these media – including twisted pair cable; coaxial cable; or an RF propagation path, as well as optical fiber.

Smart et al. did not realize (or teach) that it is possible to achieve a significant increase in the bandwidth of an optical fiber through the use of OFDM modulation. This is because Smart et al. were concerned only with data rates which could also be communicated over the limited bandwidth of RF or wired connections.

The present inventors are concerned with the very different problem of increasing the bandwidth of optical fiber, and have recognized that, through the use of OFDM, it is possible and practical to transmit data at rates far higher than previously achievable – for example 10Gbps, as discussed at p.21, line 9, of the present application as filed. Such rates are several orders of magnitude higher than could ever have been contemplated by Smart et al, since wired and RF links could not have accommodated such bandwidth.

It is further submitted that a reference such as Smart et al. would not be consulted by a skilled person trying to improve upon known systems for optical transmission, since it offers no hint that it might hold the key to increased optical bandwidth. Thus, even if non-analogous prior art such as this were consulted, it could not and does not, by itself, teach that an increase in optical bandwidth is available – to recognize this requires a further inventive insight, such as that had by the present inventors.

This reasoning applies all the more to the Examiner's suggestion that the teachings of Smart et al. can be combined with those of references in the (different) field of optical communications, so as to render the present invention obvious. The skilled person has no motivation to consult Smart in the first instance, let alone combine it with other references – particularly since those references (including Shpantzer '435 and Shpantzer NPL) relate to a system for optical wavelength division multiplexing. Such a combination is arbitrary, and can only be arrived at with the benefit of hindsight, in the knowledge of the present invention.

The Examiner has acknowledged that at least the feature of polarization multiplexing, recited in each of the independent claims, is novel. Applicants note that this feature contributes to the extremely high data rates achievable by embodiments of the present invention. The fact that this multiplexing feature is known in the context of a very different optical communication system does not mean that it can be selectively combined with teachings from a reference (Smart et al.) in a different field, and which are only accidentally relevant to the present invention.

For all these reasons, Applicants respectfully submit that each of the pending independent claims is non-obvious in view of Smart et al.

Claims 22-30, and 32 also stand rejected under 35 USC § 103(a) as being unpatentable over Dolgonos et al. (US 2002/0137464) in view of Shpantzer '435; Shpantzer NPL; and various other references.

Similar arguments to those made above apply to Dolgonos et al. This reference, in the field of wireless communications, discloses relaying a wireless OFDM signal over an optical link. This makes clear that the bandwidth of the signal under consideration is that of the wireless OFDM signal being relayed. Implicitly, therefore – as for the disclosure of Smart et al. – the

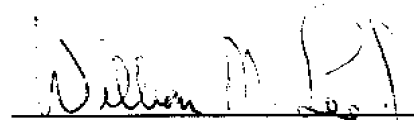
data rate of the optical transmission (using OFDM) is limited to that which could also be accommodated over a wireless link.

Therefore, any anticipation by Dolgonos et al. of an optical communications system using OFDM is entirely accidental – in the sense that Dolgonos et al. did not teach that such a system could be employed to achieve a massive increase in the data rates achievable over optical fiber. For this reason, Dolgonos et al. would not be consulted by a skilled optical communications engineer trying to improve optical transmission speeds. For this reason also, Dolgonos et al. would not be combined by such a skilled person with references in the optical communications field.

For these reasons, Applicants respectfully submit that the subject-matter of the pending independent claims is non-obvious in view of Dolgonos et al., as it is also over Smart et al., or any combination of their teachings or combination of them and the cited secondary references.

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Respectfully submitted,



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